Bull. Southern California Acad. Sci.
80(3), 1981, pp. 97–112

The Taxonomy and Distribution of Some North American *Pogonomyrmex* and Descriptions of Two New Species (Hymenoptera: Formicidae)

Roy R. Snelling

Abstract.—The taxonomy and distribution of some North American *Pogonomyrmex* and descriptions of two new species (Hymenoptera: Formicidae) by Roy R. Snelling, *Bull. Southern California Acad. Sci.* 80(3):97–112, 1981. In the nominate subgenus, the new species, *Pogonomyrmex colei,* is described from females and males; it is a workerless social parasite in nests of *P. rugosus* Emery. The previously unknown sexual forms of *P. wheeleri* Olsen are described, and new data on the distribution of *P. tenuispinus* Forel are presented. Of indeterminate status when Cole revised *Pogonomyrmex, P. hindleyi* Forel is synonymized with *P. californicus* (Buckley).

In the subgenus *Ephebomyrmex,* a new key for workers is presented, correcting errors in that of Cole; two species are added: *P. guatemaltecus* Wheeler and *P. laevinodis,* new species. New distribution data are cited for *P. guatemaltecus,* extending the range from Guatemala to Mexico. *P. laevinodis* is described from workers from Baja California Sur, Mexico.

Introduction

The North American species of *Pogonomyrmex* Mayr, 1868, were revised by Cole (1968), who recognized 22 species in two subgenera: *Pogonomyrmex,* sensu stricto, and *Ephebomyrmex* Wheeler, 1902. One name, *P. californicus* var. *hindleyi* Forel, 1914, was of indeterminate status. The present contribution provides new taxonomic and distributional data on some of these species, corrects a few errors, disposes of *P. hindleyi,* and describes two new species.

Terminology

The descriptions below are patterned after those of Cole (1968) to facilitate comparison with his descriptions. A few comments on terminology are necessary.

I prefer to use propodeum rather than "epinotum" as Cole has it. Although the latter is traditional to ant systematics, it is at variance with terminology used throughout the remainder of the aculeate Hymenoptera.

Cole uses "gena" for the area usually designated the "malar" or "oculomandibular" area; his "postgena" is the true gena. I have not followed his terminology.

The following abbreviations are used in the descriptions that follow, consistent with those of Cole.

CI (Cephalic index)—(HW)(100/HL).
EL (Eye length)—Maximum length of compound eye in lateral view.
EW (Eye width)—Maximum width of compound eye in lateral view.

HL (Head length)—Length of head, in full face view, from anteriormost portion of clypeus to top of occiput.

HW (Head width)—Maximum width of head, excluding the eyes, in full face view.

OI (Ocular index)—(EL)(100/HL). Francoeur (1973) defined OI as (EL) (100/HW). I have made no effort to determine which of these indices has "priority" but am following Cole to be consistent with his work on this genus and because I prefer it. In any event, authors should be aware of this confusion and be careful to specify which formula they are employing.

PNL (Petiolar node length)—Length of only the node of the petiole as measured in profile.

PNW (Petiolar node width)—Maximum width of the node of the petiole in dorsal view.

PPL (Postpetiolar length)—Maximum length of the postpetiole in either profile or dorsal view.

PPW (Postpetiolar width)—Maximum width of postpetiole in dorsal view.

SI (Scape index)—(SL)(100/HW). Cole incorrectly cites this as (SL) (110/HW).

SL (Scape length)—Maximum length of the scape, exclusive of the basal condyle.

WL (Weber's length)—Length of the thorax (including the propodeum) in profile view, measured diagonally from the anterior declivity of the pronotum (excluding the pronotal neck) to the tip of the metasternal lobe.

Institutional Abbreviations

The materials examined are in the collections of the following institutions: American Museum of Natural History (AMNH), Museum of Comparative Zoology, Harvard University (MCZ), National Museum of Natural History (USNM), Natural History Museum of Los Angeles County (LACM), University of California, Berkeley (UCB), University of California, Davis (UCD).

Systematics

Subgenus *Pogonomyrmex*

Pogonomyrmex (*P.*) *californicus* (Buckley, 1867)

Forel (1914) described *P. californicus* var. *hindleyi* from a single worker from Escondido, California. Later authors were unable to do much with the name. Cole (1968) rightly equated Creighton's (1950) interpretation of *P. hindleyi* with the spinose variant of *P. maricopa* Wheeler, 1914. Since Cole had not seen the type of var. *hindleyi,* he treated it as a "species indeterminata."

Forel's type is in the collections of the Museum d'Histoire Naturelle, Geneva and was made available to me. The specimen is in good condition but is heavily encrusted with dirt. I cleaned enough dirt from the specimen to determine that the juncture of the dorsal and posterior propodeal faces is weakly angulate and that the thoracic integument, between the fine rugulae, is shiny. In all respects, *P. californicus* var. *hindleyi* agrees with a common variant form of *P. californicus*; it is clear that this form may be safely relegated to the synonymy of *P. californicus* (NEW SYNONYMY).

Pogonomyrmex (*P.*) *colei* New species
Figures 1–11

Diagnosis.—Separable from other members of rugosus group by the following combination of characters. Female: HW less than 1.80 mm; face, between eye and frontal lobe, contiguously punctulate, with scattered piligerous punctures; dorsum of petiolar node with broad, shallow longitudinal impression. Male: HW less than 1.55 mm; body hairs short, stiff, blunt; basal face of propodeum finely rugulose; color blackish brown.

Description.—Female: HL 1.60–1.68 mm; HW 1.67–1.77 mm; CI 100–106; SL 1.17–1.23 mm; SI 67–72; EL 0.37–0.40 mm; EW 0.28–0.32 mm; OI 22–24; WL 2.23–2.43 mm; PNL 0.50–0.57 mm; PNW 0.47–0.50 mm; PPL 0.40–0.43 mm; PPW 0.73–0.83 mm.

Mandible (Fig. 3) with six teeth along strongly oblique masticatory margin; subapical tooth about half as long as apical tooth, closely appressed to it; first and second basals approximately equal in length, well separated from each other; penultimate basal a little shorter, subequal to basal tooth, which makes a nearly straight angle with upper mandibular margin; all teeth, except sometimes basal, moderately sharp.

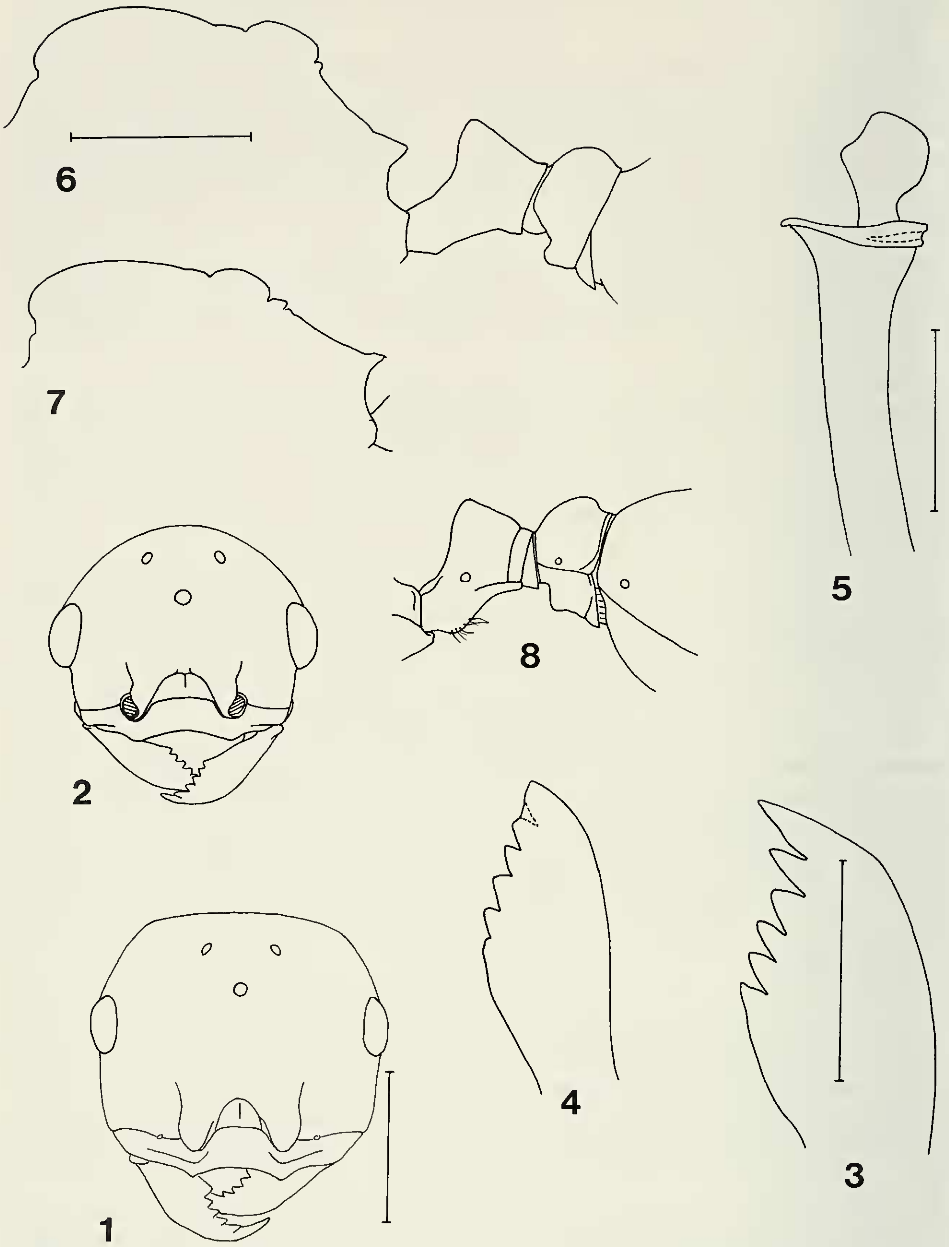
Basal enlargement of antennal scape (Fig. 5) flared, declivity of superior lobe meeting shaft in a nearly straight line; basal flange thin, reaching apex of superior lobe; lip weak, only slightly curved distad; point weak or absent.

Longitudinal rugulae extending from frontal lobes to occiput, fine and dense on frontal lobes, becoming a little coarser and less close toward occiput; weak, irregular rugulae between eye and mandible and on lower gena; no rugulae surrounding antennal fossa. Side of head, between eye and median band of rugulae, dull, irregularly microrugulose, contiguously punctulate and with scattered minute piligerous punctures, a few obscure rugulae near eye margin; upper gena weakly reticulose, interspaces microrugulose. Frontal area sharply depressed. Lateral lobe of clypeus weakly compressed, not projecting shelflike below antennal fossa. Disc of middle lobe of clypeus roughened, preapical area coarsely reticulopunctate.

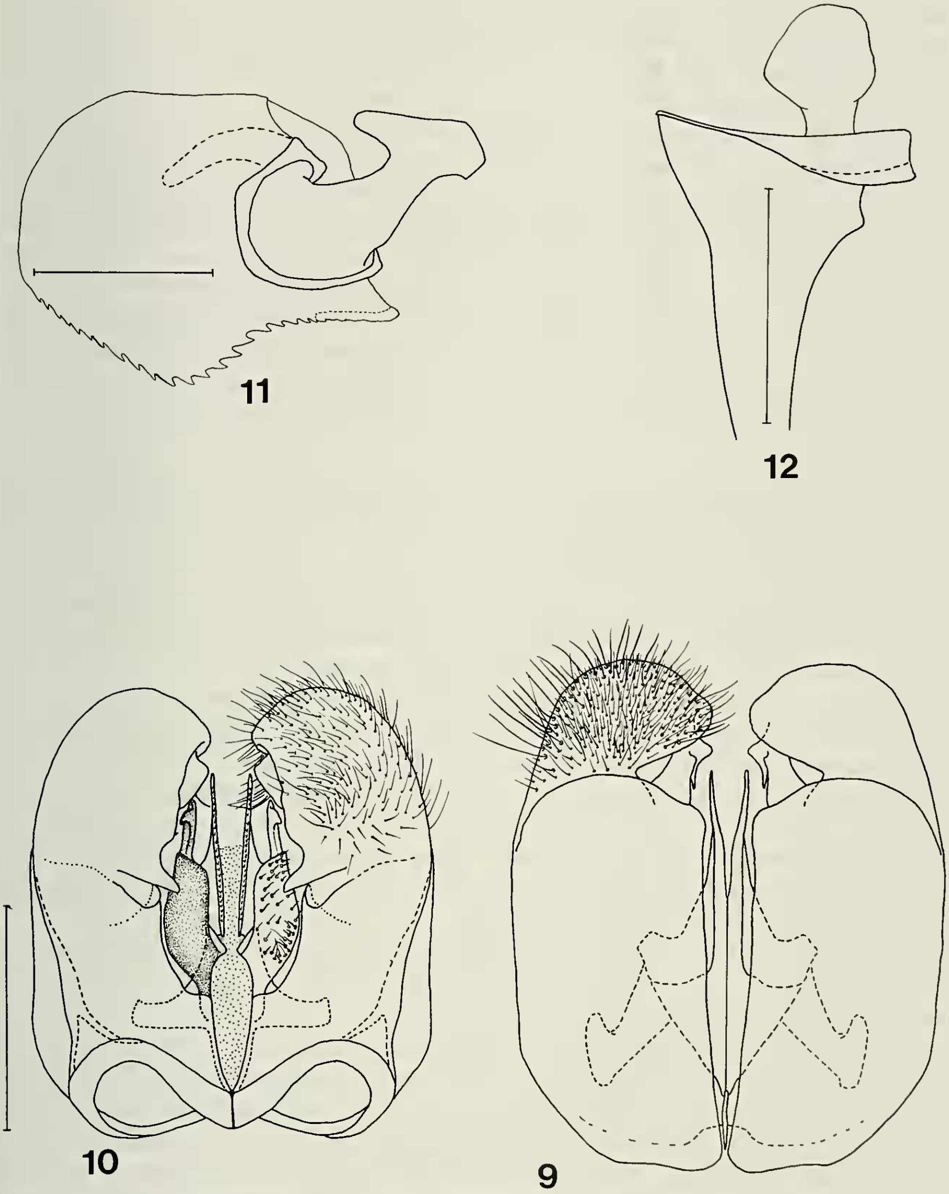
Contours, in lateral view, of thorax, petiole, and postpetiole shown in Figure 6. Propodeal spines short, broad at base, blunt to acute.

Node of petiole, in profile, coniform, length of anterior and posterior declivities subequal, or posterior slightly longer; dorsum with weak to moderate longitudinal median impression, crest notched in posterior view; ventral process of anterior peduncle weak or absent. Postpetiole, in dorsal view, subglobular; ventral process weak.

Pronotum with fine transverse and somewhat irregular rugulae, interspaces slightly shiny, weakly punctulate. Mesoscutum finely and irregularly longitudinally rugulose, interspaces moderately shiny; parapsis and area anterior to it with few or no rugulae. Scutellum smooth, polished. Upper plate of mesopleuron with fine, longitudinal rugulae and weakly punctulate interspaces; lower plate similar but becoming reticulorugose toward posterior margin. Metapleuron longitudinally rugulose, rugulae a little coarser than those of mesopleuron. Side and base of propodeum finely and closely reticulorugulose; infraspinal face mostly smooth and shiny. Node of petiole roughened and irregularly rugulose. Node of postpet-



Figs. 1–8. *Pogonomyrmex colei*: 1, 2, female and male head, respectively, frontal view; scale line = 1.00 mm. 3, 4 female and male mandibular apex, respectively; scale line = 0.50 mm. 5, base of scape of female, scale line = 0.25 mm. 6, female, profile of thorax, petiole, and postpetiole; scale line = 1.00 mm. 7, male, profile of thorax; scale line = 1.00 mm. 8, male, petiole and postpetiole, lateral view.



Figs. 9–12. 9–11. *Pogonomyrmex colei*: 9, male genitalia, dorsal view. 10, same, ventral view; scale line = 0.50 mm. 11, male aedeagus, lateral view; scale line = 0.25 mm. 12, *P. wheeleri*: base of scape of female; scale line = 0.25 mm.

iole slightly shiny and weakly punctulate, with a few weak, irregular rugulae at side and across posterior margin. Gaster smooth, shiny, without distinct shagreening.

Body hairs moderately long and abundant, mostly slender and acute. Some hairs on mesocutum, especially anteriorly, blunt-tipped. Hairs on frontal region short, fine, blunt-tipped. Side of pronotum and mesopleuron with hairs sparse, short, mostly acute, a few blunt. Erect hairs of gastric dorsum weakly pointed to blunt. All hairs golden.

Body color dark reddish brown, gaster more reddish.

Male: HL 1.33–1.43 mm; HW 1.40–1.50 mm; CI 93–99; SL 0.83–0.87 mm; SI 56–60; EL 0.40–0.43 mm; EW 0.30–0.33 mm; OI 29–32; WL 2.03–2.17 mm; PNL 0.40–0.47 mm; PNW 0.47–0.50 mm; PPL 0.38–0.50 mm; PPW 0.70–0.77 mm. Closely resembling female in size, color, and general habitus.

Mandible (Fig. 4) slender, about 3.5 times longer than greatest width; masticatory margin strongly oblique; apical tooth broad and indistinctly separated from preapical tooth; remaining teeth short, broad, oblique; basal tooth aligned with basal margin of mandible. Base of antennal scape somewhat trumpet-shaped. Frontal area sharply depressed. Interocellar distance 3.6–4.0 times diameter of anterior ocellus.

Frons with obscure, weak longitudinal rugulae, stronger in interocellar area; head otherwise with only scattered, obscure, short rugulae; moderately shiny and weakly to moderately punctulate.

Configuration of thorax, petiole, and postpetiole as in Figures 7 and 8. Propodeal spines stout, triangular, subacute to acute, a short carina extending basad of each spine. Apex of petiolar node more rounded than that of female; subpetiolar process low, rounded; subpostpetiolar process weak; node of petiole, in dorsal view, without longitudinal impression, crest not notched.

Mesoscutum smooth, shiny; side of pronotum moderately shiny and punctulate; upper plate of mesopleuron with fine longitudinal striae, lower plate less shiny, finely vermiculate; metapleuron with coarse, longitudinal rugulae, interspaces shiny; lateral and basal faces of propodeum transversely vermiculate to irregularly rugulose, interspaces moderately shiny, weakly punctulate; declivity shiny, with a few transverse rugulae or none; nodes of petiole slightly shiny and irregularly rugose at sides. Gaster smooth and shiny.

Body hairs golden; about as in female; i.e., not silky, tending to be stout, flattened, and with blunt apices, even on gaster.

Body color about as in female.

Type material.—Holotype female, allotype, 73 female and 45 male paratypes: 2 mi SE Boulder City, 2250 ft, Clark Co., NEVADA, 18 Sept. 1978 (S. W. Rissing, No. NE 212), from nest of *Pogonomyrmex rugosus* Emery 1895. Holotype, allotype, and most paratypes in LACM; paratypes distributed to AMNH, MCZ, USNM and collections of S. W. Rissing and of G. C. and J. Wheeler.

Etymology.—It is fitting that this unusual species be dedicated to A. C. Cole, Jr., reviser of the genus and respected friend and colleague.

Additional material.—One alate female: Jones Water Recreation Area, 17.3 mi N Globe, Gila Co., ARIZONA, 27 Aug. 1964 (M. E. Irwin; LACM).

Discussion.—The specimens from the type series were collected between 0900 and 1315 as they emerged from the nest of the host species. Since alates of both sexes of the host also emerged from the same nest, it is obvious that the gyne of *P. rugosus* was alive and functional. The biology and behavior of *P. colei* will be reported on by Rissing in a paper now in preparation.

Cole (1954) described *P. anergismus* from a series of males and females taken from a nest of *P. rugosus* near Silver City, New Mexico. Because these individuals were within the *P. rugosus* nest and because no corresponding workers were found, he assumed *P. anergismus* to be a workerless social parasite. The gyne of the host species was not found, nor were alates of either sex noted to be present. *P. anergismus* is known only from the type series.

The present species is the second known socially parasitic *Pogonomyrmex* from North America and shares with *P. anergismus* the same host species. Because the females and males of *P. anergismus* are highly modified morphologically, their affinities were uncertain. Now that *P. colei* has been discovered, the relationships of *P. anergismus* can be clarified.

At first sight, the females and males of *P. colei* look like unusually small individuals of *P. rugosus*. Only on closer examination is it apparent that they are not that species. This is especially obvious in the males. Those of *P. rugosus* are quite hairy on all surfaces; the hairs are white, long, slender, more or less flexuous, and acute at the apices. In contrast, those of the *P. colei* males are golden, short, stiff and usually with bluntly pointed, or even truncate, apices. They also seem less abundant, but this may be an illusion generated by the fact that they do not become intermingled as they do in *P. rugosus*.

The head of *P. colei* is less shiny than that of *P. rugosus* males since most of the frontal surface is closely, albeit weakly, punctulate, not mostly smooth and shiny as in *P. rugosus*. The antennal scape is clearly longer than that of *P. rugosus* (SI 32–35). In *P. rugosus,* the greatest diameter of the anterior ocellus is less than that of the posterior ocelli; in *P. colei,* they are about equal.

Male thoracic structure is very similar, the most obvious difference being that the thorax of *P. rugosus* is mostly smooth and shiny. There are scattered piligerous punctures, and the propodeum bears weak to moderately strong striations or rugulae.

In male *P. rugosus,* the node of the petiole, in profile, is low and broadly rounded. When seen from above, the node is clearly wider than long and rather evenly arcuate across the top; the surface is smooth and shiny. A distinct subpetiolar process is usually present. All these are in sharp contrast to the characteristics just described for the petiolar node of *P. colei.*

The postpetioles of the two species are more similar, but, in dorsal view, the side of that of *P. colei* is less arcuate. Again, the node is smooth and shiny in *P. rugosus,* and the subpostpetiolar process is smaller.

In stature, the male of *P. anergismus* is like that of *P. colei.* Its golden yellow color and largely smooth, shiny integument are, however, in sharp contrast. The antennal scape is relatively long as in *P. colei.* However, in *P. anergismus*, the anterior ocellus is *greater* in diameter than the posterior ocelli.

The thoraces of *P. anergismus* and *P. colei* are similar, but for the smoother and shinier integument of *P. anergismus*; punctulae are rare to absent, and the sides of the thorax are weakly to moderately striate or rugulose, without obvious tendencies toward being vermiculose.

The profiles, both lateral and dorsal, of the petiole and postpetiole are similar in the two species, but, again, the surface is smooth and shiny in *P. anergismus.* However, the posterior face of the node of the petiole has a broad longitudinal impression, lacking in the *P. colei.*

The genitalia of the two species are quite similar. The most obvious difference is that the ventral lobes of the aedeagus are sharply serrate in *P. anergismus*. The teeth are mostly obliterated, except basad, in *P. colei* (Fig. 11). There are also differences in the paramere in dorsal view and in the volsella. The aedeagus of *P. anergismus* is more like that of *P. rugosus* than is that of *P. colei*. The volsella and paramere of *P. colei* are more like those of *P. rugosus* than are those of *P. anergismus*.

The resemblance between females of *P. colei* and *P. rugosus* is much closer than that of the males. Obvious differences include the smaller size and shorter, stouter, sparser golden brown hairs in the former. The masticatory margin is oblique, and the outer face of the mandible is, in large part, smooth and shiny in *P. colei*. Most of the head is punctulate, not coarsely striate as in *P. rugosus*. The shape of the head is quite different in frontal view, since the sides of the head above the eyes are subparallel in *P. rugosus*, rather than convergent as in *P. colei*.

The thoracic, petiolar, and postpetiolar profiles are similar, although the petiolar node is more conoid in *P. colei*. Again, *P. colei* females have distinctly punctulate interrugal spaces, usually smooth or very weakly punctulate in *P. rugosus*. The propodeum of *P. rugosus* is crossed by sharp, well-spaced, coarse rugae; in *P. colei*, the propodeum is finely vermiculate-rugose. The posterior face of the petiolar node of *P. colei* is distinctly impressed along the middle, and the crest is more or less sharply notched.

The females of *P. colei* and *P. anergismus* bear about the same relationship to one another as do their respective males. They are similar in size but immediately are separable because the female of *P. anergismus* is golden yellow, with much of the body smooth and shiny. Other distinctive characteristics of the *P. anergismus* female include: fully striate mandible; longer, narrower apical mandibular tooth; less abruptly depressed frontal area; subclavate setae on frons, side of pronotum, mesopleuron, and subpetiolar process; transversely striate propodeum; mostly smooth mesoscutum.

That these two species, *P. anergismus* and *P. colei*, are closely related seems evident, and they are related to the host species, *P. rugosus*. In fact, in most characters, *P. colei* seems to be intermediate between *P. rugosus* and *P. anergismus*. The major difficulty in this interpretation is one of sculpture. The mandibles of *P. rugosus* are coarsely striate, but largely smooth in *P. colei*. They are also striate in *P. anergismus*. Much the same consideration applies in the matter of the sculpture of the side of the face: longitudinally rugulose in *P. rugosus* and *P. anergismus*, punctulate and with a few weak rugulae in *P. colei*.

I do not think it possible to derive either parasitic species from the other. While it also appears unlikely that the parasites evolved from the host, it is possible that all three are derived from a common prototypic form. The rarity of socially parasitic species hinders study of this paradoxical problem.

Since both females and males fail at the first couplet of Cole's keys (1968) for these castes, the following modification may be made to accommodate *P. colei*.

Females

1. Petiolar node, in profile, a weakly truncated cone, anterior and posterior faces subequal in length; dorsum of petiolar node with distinct broad,

shallow median impression (crest may be notched in posterior view); HW less than 1.75 mm .... 1′

– Petiolar node, in profile, not a truncated cone, anterior face usually distinctly shorter than posterior; dorsum of petiolar node without median impression, crest not notched in posterior view; HW at least 1.90 mm, usually more than 2.00 mm 2

1′ Face between eye and frontal lobe with fine, longitudinal rugulae; hairs of propleura short, blunt, subspatulate; base of propodeum transversely striate .... *anergismus*

– Face finely punctulate between eye and frontal lobe; hairs of propleura long, slender; base of propodeum vermiculate-rugose .... *colei*

Males

1. Body hairs stiff, coarse; *either* petiolar node, in profile, distinctly conoid *or* dorsum of node with broad, longitudinal impression; HW less than 1.50 mm. .... 1′

– Body hairs long, flexuous; petiolar node neither conoid nor with median impression; HW more than 1.60 mm 2

1′. Dorsum of petiolar node with longitudinal impression; basal face of propodeum shiny between fine, transverse rugulae, usually smooth in middle; color yellowish .... *anergismus*

– Petiolar node without dorsal longitudinal impression; basal face of propodeum dull, uniformly vermiculate-rugose; color blackish brown ... *colei*

Pogonomyrmex (P.) *tenuispinus* Forel, 1914

When Cole (1968) revised the North American *Pogonomyrmex* he had available only nine workers, all from southern Baja California Sur. Subsequently, Wheeler and Wheeler (1973) recorded the species from Deep Canyon, Riverside County, Calif. The following records, all from Lower California, will amplify our knowledge of the distribution of this poorly known species, still known only from workers.

BAJA CALIFORNIA SUR: 23 mi N La Paz, 11 Nov. 1965 (W. H. Ewart); Comondu, Feb. 1923 (W. M. Mann); 7.5 mi W El Triunfo, 11 Oct. 1968 (E. M. Fisher and E. L. Sleeper); Miraflores, 28 Oct. 1968 (E. M. Fisher and E. L. Sleeper); 10 km S Santa Rosalia, 700 ft, 4 Oct. 1975 (R. R. Snelling, No. 75-50); 3.7 mi W La Burrera, 1400 ft, 7 Oct. 1975 (R. R. Snelling, No. 75-54); 27 km NE Todos Santos, 900 ft, 8 Oct. 1975 (R. R. Snelling, No. 75-58); 49 km E Villa Insurgentes, 1200 ft, 9 Oct. 1975 (R. R. Snelling); 9 km SE Santa Rita, 250 ft, 26 Aug. 1977 (R. R. Snelling, No. 77-65). BAJA CALIFORNIA: 4 mi S Las Arrastras (de Arriola), 9 June 1967 (E. L. Sleeper and E. M. Fisher). All specimens in LACM.

No. 75-50: "The nest was on a rocky hillside, without tumulus. Workers were foraging in a column about 30 m long; they were rapid, agile, and easily excited. When disturbed, the workers did not exhibit the "alarm-pose" of such related species as *P. rugosus*. Foragers were not active 1 hour after sunrise on the following morning."

No. 75-54: "Nest at edge of road through Cape thorn forest (kaatinga); no tumulus; foraging in column at midday."

No. 75-58: "Nest in packed soil at edge of arroyo; acacia-cardón scrub; workers foraging at 1500, long column."

At "49 km E Villa Insurgantes, nest in very hard, rocky soil; acacia-cardón scrub; no tumulus."

No. 77-65: "Nest in packed soil, no tumulus, but a small fan of debris 7–10 cm from entrance; jotropha-olneya scrub."

Pogonomyrmex (*P.*) *wheeleri* Olsen, 1934
Figures 12–16

This impressively large Mexican species has been known only from the worker caste. A few males and females are now available and are described herewith.

Description.—Female: HL 2.65–2.83 mm; HW 3.20–3.25 mm; CI 118–121; SL 1.85–1.93 mm; SI 57–59; EL 0.58–0.60 mm; EW 0.35–0.40 mm; OI 21–23; WL 4.0–4.4 mm; PNL 0.70–0.90 mm; PNW 0.85–0.95 mm; PPL 0.60–0.70 mm; PPW 1.25–1.40 mm.

Apical tooth of mandible more than twice as long as preapical; preapical tooth a little longer than first basal; basal teeth progressively smaller, penultimate tooth quite small, ultimate basal tooth large, triangular acute, upper margin continuous with upper margin of mandible.

Shaft of scape strongly curved at base (Fig. 12) and flattened or depressed basad of curve, longitudinal peripheral carina strong, narrow; superior lobe well developed, its margin a long, weak curve into shaft; basal flange weak, narrow, margin thin and reaching apex of superior lobe; lip prominent; inferior lobe weak, evenly rounded into shaft, point low and obtuse.

Cephalic rugulae fine and dense, about 20–22 rugulae per 0.50 mm on frons below ocelli, becoming finer toward eye; rugulae a little coarser on gena, about 15–18 per 0.50 mm.

Frontal area vertically depressed. Lateral lobe of clypeus weakly compressed and weakly projecting.

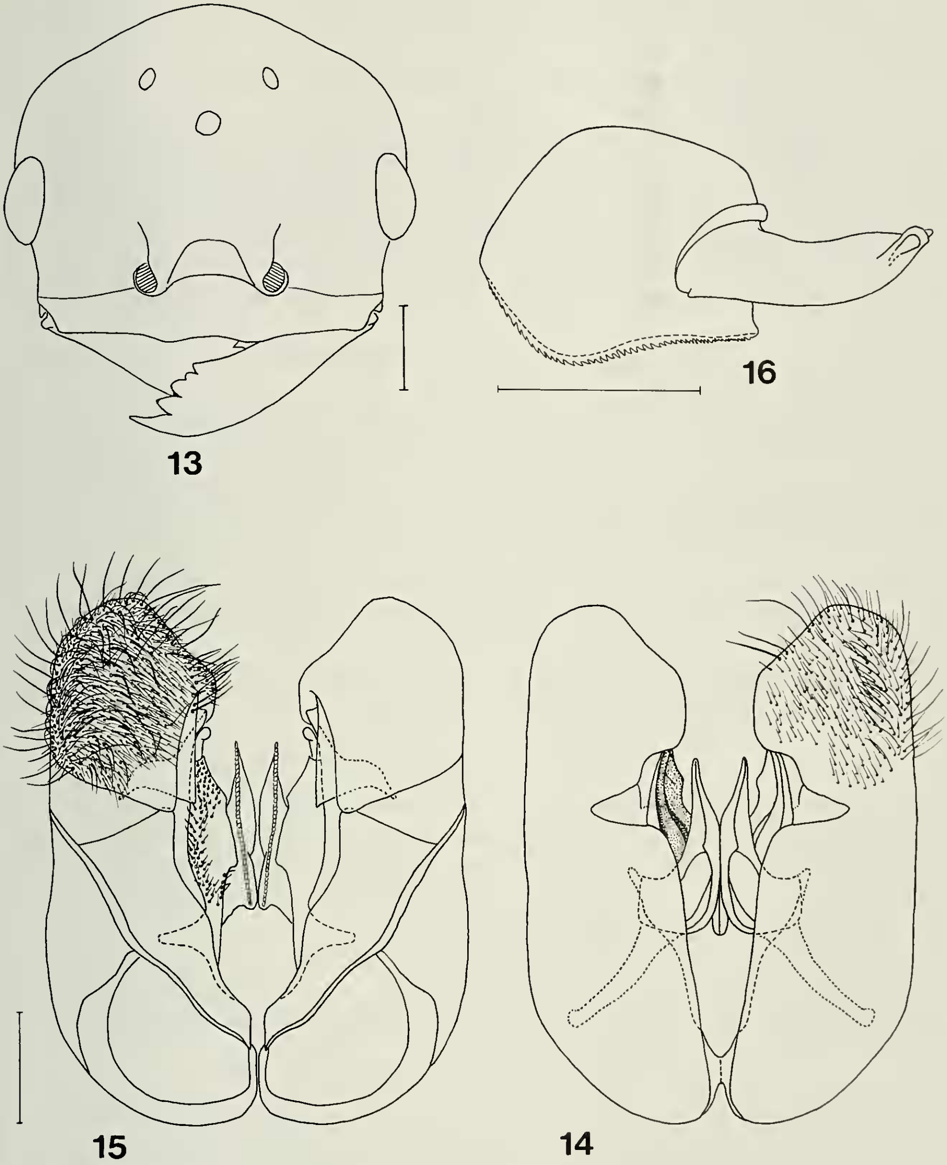
Propodeal spines short, acute. Pronotum mostly smooth and shiny, with weak transverse rugulae across declivity above neck, extending onto lateral face; mesoscutum longitudinally rugulose, rugulae finer laterad; scutellum largely smooth and shiny, with weak rugulae laterad; mesopleuron with fine longitudinal rugulae, interspaces punctulate on lower plate; metapleuron and side of propodeum coarsely longitudinally rugose, rugae of propodeum becoming transverse across basal face, interspaces shiny.

Crest of petiolar node distinctly notched; nodes slightly shiny, with weak, shallow, fine punctulae; petiolar node with few or no fine, widely spaced longitudinal rugulae; postpetiolar node with few or no fine, transverse rugulae.

Uniformly dark ferruginous.

Male: HL 2.10–2.20 mm; HW 2.40–2.50 mm; CI 112–116; SL 1.05–1.15 mm; SI 49–55; EL 0.65–0.75 mm; EW 0.43–0.50 mm; OI 28–34; WL 3.65–4.00 mm; PNL 0.66–0.70 mm; PNW 1.00–1.10 mm; PPL 0.60–0.75 mm; PPW 1.30–1.40 mm.

Mandible (Fig. 13) broad, lower margin nearly straight in basal half, then weak-



Figs. 13–16. *Pogonomyrmex wheeleri*, male: 13, head, frontal view; scale line = 0.50 mm. 14, genital capsule, dorsal view. 15, same, ventral view; scale line = 0.50 mm. 16, aedeagus, lateral view; scale line = 0.50 mm.

ly curved into lower margin of apical tooth; apical tooth long, broad; preapical tooth short, broad; first basal tooth short, obtuse; ultimate basal weak; outer face striate and coarsely, closely punctate, especially along upper and apical margins.

Cephalic rugulae fine and dense on frons, becoming weak toward margins, broken by coarse, shallow, piligerous punctures; gena rather shiny and with only a few weak rugulae, which curve under lower end of eye; oculomandibular area without longitudinal rugulae, but a few transverse to oblique rugulae usually present.

Interocellar distance about 3 times diameter of anterior ocellus; anterior ocellus smaller than posterior ocelli.

Propodeal teeth absent or barely indicated. Thorax mostly smooth and shiny; mesopleuron with a few longitudinal rugulae on upper plate, lower plate duller, finely and closely punctate between obscure longitudinal rugulae; metapleuron and propodeal side shiny between moderately coarse longitudinal rugulae, turning onto basal face of propodeum but absent across its middle; middle of propodeum, from base to apex, smooth and shiny. Nodes of petiole and postpetiole smooth and shiny.

Hairs mostly whitish to pale yellowish, long, slender, flexuous, abundant, shorter on appendages; relatively sparse on gaster.

Color blackish-brown; gaster dark reddish-brown; appendages lighter.

Material examined.—4 ♀♀, 6 ♂♂, 9 mi N Mazatlán, Sinaloa, MEXICO, 25 July 1973 (J. Chemsak, E. G. Linsley, and A. E. Michelbacher; UCB); 1 ♀, 1 mi N Mazatlán, Sinaloa, MEXICO, 27 Dec. 1968 (D. L. Briggs; UCD).

Discussion.—The male, by virtue of its large size, basally flattened scape, and uniformly blackish color, is easily separated from males of other species of the *barbatus* complex. The peculiar sculpturation of the mandible is also characteristic.

The female will go to *P. barbatus* in Cole's (1968) key, but differs by its large size and weakly (or not at all) rugose petiolar node.

Subgenus *Ephebomyrmex*

The status of *Ephebomyrmex,* whether a genus or subgenus, is yet to be determined. In particular, the South American fauna must be comprehensively studied and compared to that of North America. Cole's (1968) revision of the North American *Pogonomyrmex* treated *Ephebomyrmex* as a subgenus; for convenience, I will follow that arrangement here.

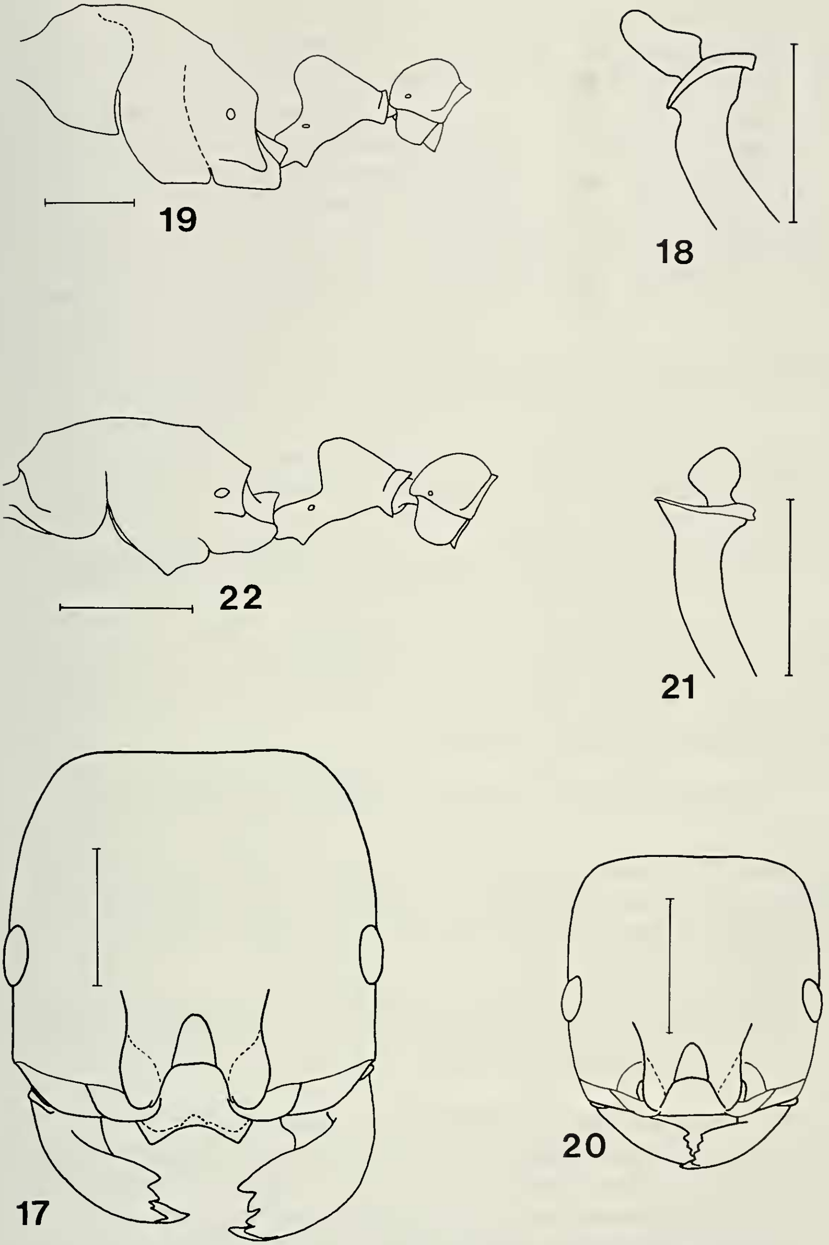
In the worker portion of Cole's key, there is a serious typographic error, which could easily confuse anyone not familiar with these ants. A new key is presented below to rectify this error and to include two additional species, one new.

Key to Workers, Subgenus *Ephebomyrmex*

1a. Small, HW 0.97–1.21 mm; eye large, notably longer than wide, oculomandibular distance no more than about 1.2 times EL; base of propodeum reticulose, without distinct transverse rugae; in lateral view, meeting mesonotum at a prominent angle 2

b. Larger, HW more than 1.30 mm; eye variable, but often small, oculomandibular distance at least 1.5 times EL (if larger, propodeal spines absent); base of propodeum transversely rugose *or* largely smooth and propodeal spines absent; in lateral view, base of propodeum not meeting mesonotum at prominent angle. 4

2a. Propodeal spines present; longest pronotal hairs stiff, seta-like, little (if any) longer than EL; nodes of petiole and postpetiole distinctly sculptured 3



Figs. 17–22. 17–19, *Pogonomyrmex guatemaltecus*, worker: 17, head, frontal view; scale line = 0.50 mm. 18, base of scape; scale line = 0.25 mm. 19, lateral view, thorax, petiole, and post-petiole; scale line = 0.50 mm. 20–22, *P. laevinodis*, worker. 20, head, frontal view; scale line = 0.50 mm. 21, base of scape; scale line = 0.25 mm. 22, lateral view, thorax, petiole, and post-petiole; scale line = 0.50 mm.

b. Propodeal spines absent; longest pronotal hairs slender, flexuous, distinctly longer than EL; nodes of petiole and postpetiole for the most part smooth and shiny, often weakly punctulate anteriorly and posteriorly .... *laevinodis*, n. sp.

3a. Clypeus with prominent toothlike projection below each antennal socket; posterior declivity of petiolar node, in profile, much longer and less steep than anterior declivity, surface rugoreticulose; dorsum of postpetiolar node irregularly longitudinally rugose .... *imberbiculus* Wheeler

b. Clypeus without toothlike projection below each antennal socket; petiolar node conical in profile, surface punctate; dorsum of postpetiolar node punctate .... *pima* Wheeler

4a. Propodeal spines present; dorsum of petiolar node irregularly, transversely rugose; longest pronotal hairs slender, whitish, longer than EL .... *huachucanus* Wheeler

b. Propodeal spines absent; dorsum of petiolar node longitudinally rugose; longest pronotal hairs stout, stiff, brownish yellow, distinctly shorter than EL .... *guatemaltecus* Wheeler

Pogonomyrmex (*Ephebomyrmex*) *guatemaltecus* Wheeler, 1914

Figures 17–19

This distinctive species was described from Zacapa, GUATEMALA. Recently collected material extends the range into MEXICO: Paderón, Río Tehuantepec, Oaxaca, 24 Feb. 1948 (T. MacDougal; AMNH); 8 km W Tehuantepec, 10 Aug. 1974 (E. M. and J. L. Fisher; LACM).

Pogonomyrmex (*Ephebomyrmex*) *laevinodis* New species

Figures 20–22

Diagnosis.—Separable from other members of subgenus *Ephebomyrmex* by the following combination of characters. Worker: Propodeal spines absent; nodes of petiole and postpetiole largely smooth and shiny; eye length about equal to oculomandibular distance. Female and male unknown.

Description.—HL 0.96–1.12 mm; HW 0.90–1.05 mm; CI 92–96; SL 0.68–0.74 mm; SI 72–78; EL 0.19–0.23 mm; EW 0.13–0.15 mm; OI 19–24; WL 0.97–1.13 mm; PNL 0.27–0.32 mm; PNW 0.26–0.32 mm; PPL 0.23–0.29 mm; PPW 0.38–0.46 mm.

Mandible about as usual in *Ephebomyrmex*; apical and preapical teeth acute, broad, thin, apical tooth longest; first basal about half as long as preapical, subacute; second basal very short and narrowly separated from first; third basal broadly separated from second, a little smaller than first; penultimate basal very small, triangular and its upper margin slightly offset from straight to weakly convex upper mandibular margin; ultimate basal tooth absent.

Base of antennal scape (Fig. 21) with shaft strongly curved but not flattened, basal enlargement well developed; superior lobe weak; basal flange thin, narrow; lip well developed, broad, slightly reflexed; point present.

Eye large, greatest length 1.5 times or more greatest width, oculomandibular distance subequal to eye length.

Lateral lobe of clypeus, below antennal socket, compressed and projecting forward (weaker than in *P. imberbiculus*).

Thoracic, petiolar, and postpetiolar profiles as in Figure 22. Propodeal spines absent, posterior declivity bounded on each side and across summit by a prominent carina. In lateral view, anterior declivity of petiolar node nearly vertical, a little shorter than posterior declivity; node, in posterior view, about as long as wide; subpetiolar process large, triangular.

Head longitudinally rugose, with few transverse rugae, interspaces moderately shiny and irregularly roughened but without definite punctulae and with sparse, shallow setigerous punctures. Thorax coarsely reticulorugose, interspaces moderately shiny and with sparse, shallow setigerous punctures. Dorsum of petiolar and postpetiolar nodes shiny between sparse, piligerous punctures, occasionally with weak punctulae along posterior margins.

Erect hairs golden brown, very uneven but longest pronotal hairs exceeding eye length; hairs short and stiff on frons; few or none on petiolar venter; shorter on appendages; eyes with numerous very short, fine hairs.

Color light to dark ferruginous.

Type material.—Holotype worker and 34 worker paratypes: 27 km NE Todos Santos, 900 ft, Baja California Sur, MEXICO, 8–9 Oct. 1975 (R. R. Snelling, No. 75-59). Holotype and most paratypes in LACM; three paratypes each to: AMNH, MCZ, USNM and personal collection of G. C. and J. Wheeler.

Etymology.—From Latin, *laevis* (smooth) and *nodus* (knot, node), for the smooth, shiny nodes of the petiole and postpetiole.

Additional material.—20 km NW La Paz, 100 ft, 5 Oct. 1975 (R. R. Snelling; LACM).

Discussion.—The characteristics cited in the key and in the diagnosis should be sufficient for recognition of this ant.

It appears that the species is most closely allied to *P. imberbiculus* and replaces it in southern Lower California.

The type series nest was in hard-packed, sandy soil at the edge of a large arroyo, in acacia-cardón scrub (kaatinga). The nest entrance was surrounded by a low crater of excavated soil, about 5.5 cm in diameter. Workers were foraging at 1700.

The record from 20 km NW of La Paz is based on a single stray taken in late afternoon from *Opuntia* sp. In the field, foraging *P. laevinodis* workers very closely resemble those of *Tetramorium spinosum* (Pergande).

Acknowledgments

I am indebted to S. W. Rissing for making available, and allowing me to describe, the series of *P. colei*. Other specimens were made available by J. A. Powell (UCB), J. G. Rozen, Jr. (AMNH) and R. O. Schuster (UCD). Particular thanks must be extended to C. Besuchet for allowing me to study the type of *P. californicus* var. *hindleyi*.

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Accepted for publication 12 February, 1982.

Entomology Section, Natural History Museum of Los Angeles County, 900 Exposition Blvd., Los Angeles, California 90007.

Bull. Southern California Acad. Sci.
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A New Species of Neotenic *Ambystoma* (Amphibia, Caudata) Endemic to Laguna Alchichica, Puebla, Mexico

Ronald A. Brandon,[1] Edward J. Maruska,[2] and William T. Rumph[3]

Abstract.—A New Species of Neotenic *Ambystoma* (Amphibia, Caudata) Endemic to Laguna Alchichica, Puebla, Mexico by Ronald A. Brandon, Edward J. Maruska, and William T. Rumph, *Bull. Southern California Acad. Sci.* 80(3):112–125, 1981. Comparison of the neotenic population of *Ambystoma* that is endemic in Laguna Alchichica with the holotype of *Ambystoma subsalsum* Taylor 1943, and with *A. tigrinum* from several populations in Puebla, Tlaxcala, and Hidalgo reveals that the holotype is identifiable as *A. tigrinum* and is specifically different from the Laguna Alchichica neotenes. The population in Laguna Alchichica is described; this species differs from *A. tigrinum* in number of gill rakers, in morphology of the base of the dorsal body fin, in coloration, in number of vomerine teeth, in morphology of the vomerine tooth series, in apparently requiring saline waters, and in being neotenic.

Introduction

Nearly 40 years ago, Edward H. Taylor (1943) described and named a new species of salamander, *Ambystoma subsalsum,* from Laguna Alchichica, one of several crater lakes (axalapazcos) in the llanos of eastern Puebla, Mexico. At that time other populations of *Ambystoma* in the Llanos de San Juan and Llanos de San Andres (Fuentes 1972, describes the surface morphology of the region) had not been studied although Taylor (1943) noted that two other nearby lakes also contained populations of salamanders, and specimens of *A. tigrinum* had been collected previously at other localities in Puebla.

As holotype of *A. subsalsum* Taylor selected the only transformed specimen available from the vicinity of Lake Alchichica, FMNH 100007 (formerly E.H.T.-